


## Practical Ocular Examination: Ocular Allergies and Treatment

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## Learning Objectives

Workshop attendees should leave with:

- The ability to identify common ocular allergic processes
- Awareness of options to treat ocular allergic processes

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## Differential Diagnosis of Red Eye



Common Causes of Red Eye	
Allergic Processes	
SAC, PAC	VKC, AKC, GPC
Infectious	
Viral/Bacterial Conjunctivitis	
Immunological	
Uveitis, Scleritis	
Ocular Surface Disease	
Dry Eye, Blepharitis, Rosacea	
Miscellaneous	
Angle Closure Glaucoma, use of Glaucoma Medications, Foreign Body Reaction, Trauma	

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## Ocular Allergic Processes

### Allergic Conjunctivitis

- Seasonal (SAC) and Perennial Allergic Conjunctivitis (PAC)

### More Severe Allergic Processes

- Vernal Allergic Conjunctivitis (VKC)
- Atopic Allergic Conjunctivitis (AKC)
- Giant Papillary Conjunctivitis (GPC)

### Drug Induced Allergic Conjunctivitis

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## Allergic Conjunctivitis: Epidemiology and Pathophysiology

- Most common ocular allergic process<sup>1</sup>  
20% incidence in US population, 90% suffer ocular symptoms<sup>2</sup>
- Type I hypersensitivity reaction
- Associated with Allergic Rhinitis, IgE mediated
- PAC occurs year round with seasonal exacerbations and is generally mediated by indoor allergens

<sup>1</sup> Arbes SJ et al. Prevalences of positive skin test responses to 10 common allergens in the U.S. population: Results from the Third National Health and Nutrition Examination Survey. *J Allergy Clin Immunol*. 2005; 116:377-383.

<sup>2</sup> Airborne allergens: Something in the air- National Institute of Allergy and Infectious Diseases. NIH Publication No. 03-7045. 2003.

<sup>3</sup> Karsanov CH, Bialer L. Evidence-based study design in ocular allergy trials. *Curr Opin Allergy Clin Immunol*. 2008;8(5):484-6.

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## Seasonal Allergic Conjunctivitis

### Symptoms

- Itching, tearing, redness
- Occurs bilaterally and with coincident onset (in contrast to infectious conjunctivitis)

### Investigations

- Conjunctival Scraping can reveal varying amounts of eosinophils
- Increased histamine in tears

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### Seasonal Allergic Conjunctivitis: Exam Findings

- Bilateral conjunctival hyperemia
- Palpebral conjunctival chemosis and papillae, more prominent inferiorly
- Allergic Shiners (more strongly associated with allergic rhinitis)




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### Seasonal Allergic Conjunctivitis: Treatment Options

- Non-pharmaceutical options
  - Avoidance of eye rubbing
  - Allergen avoidance
    - use of sunglasses and large brim hat when outdoors.
- Symptoms may be relieved by cold compresses and cooled artificial tear use
- Consider Rx treatment when patient suffers from 2 or more days per month of bothersome symptoms.

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### Seasonal Allergic Conjunctivitis: Treatment Options

First line options in management of SAC, onset in minutes

Medication	Mechanism	Dosing	Side Effects
Olopatadine (Patanol or Pataday)	H1 and H2 blocker, mast cell stabilizer	QD (0.2%) and BID (0.1%) formulation	Limited URI symptoms <10%, Headaches
Epinastine (Elestat)	H1 blocker, mast cell stabilizer, NSAID	BID	Limited URI symptoms <10%, Headaches
Ketotifen (Zaditor)	H1 blocker, mast cell stabilizer, NSAID	BID	Limited URI symptoms <10%
Azelastine (Optivar)	H1 blocker, mast cell stabilizer, NSAID	BID	Eye burning, Headaches

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## Seasonal Allergic Conjunctivitis: Treatment Options

Previously favored first line agents in treatment of SAC, rapid onset

Medication	Mechanism	Dosing	Side Effects
Nedocromil (Alocril)	H1 blocker, mast cell stabilizer, NSAID	BID	Eye burning
Pemirolast (Alamast)	H1 blocker, mast cell stabilizer, NSAID	BID	Eye burning
Levocabastine (Livostin)	H1 blocker	BID-QID	Eye burning
Emedastine (Emadine)	H1 blocker	QID	Eye burning

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## Seasonal Allergic Conjunctivitis: Treatment Options

Previously favored second line agents

Medication	Mechanism	Dosing	Onset
Cromolyn (Crolom, Opticrom)	Mast Cell Stabilizer	QID	After 6 weeks of regular use
Lodoxamide (Alomide)	Mast Cell Stabilizer and Eosinophil inhibitor	QID	After 4-6 weeks of regular use

Older generation mast cell stabilizers are more specific for lung mast cells

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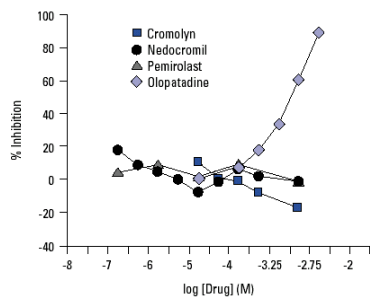
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Figure 1.  
Effect of Antihistergics on Histamine Release  
from Human Conjunctival Mast Cells



Yanni et al, 1997

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### Seasonal Allergic Conjunctivitis: Treatment Options

Steroids may be considered in a short course for stabilization of severe allergic disease.

Medication	Dosing	Ocular Surface Penetration
Loteprednol (Lotemax or Alrex)	QD-QID	Low
Fluoromethalone (FML or Flarex)	QD-QID	Low
Prednisolone Acetate (Pred-Forte, Ominpred)	QD-QID	High
Difluprednate (Durezol)	QD-BID	Highest

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### Seasonal Allergic Conjunctivitis: Treatment Cautions

In ophthalmology, no steroid is considered "safe"

- Patients should be monitored by specialist due to risk of increased intraocular pressure, infection, and cataract.
- Preferable to use agents with low absorption through ocular surface.



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### Seasonal Allergic Conjunctivitis: Additional Medication Classes

Medication Class	Considerations
Vasoconstrictors (Naphcon-A, Vasocon-A, Opticon)	Heavily marketed Does not treat pathology Masks disease Rebound hyperemia
Topical Ophthalmic NSAIDs (diclofenac, ketorolac, flurbiprofen)	Effective in PG mediated inflammation Limited effect with conjunctival process

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## Vernal Keratoconjunctivitis (VKC) Definition/Epidemiology

Particularly severe form of SAC with type I and IV hypersensitivity components typically affecting:

- Males>Females (2:1), generally with onset prior to 10 years of age and duration of 2-10 years. Generally improves and resolves with puberty.
- Associated with atopic dermatitis (75%) and family history of atopy (66%)
- Onset generally during summer

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## Vernal Keratoconjunctivitis (VKC) Symptoms/Exam Findings

- Intense itching, pain and photophobia
- Findings
  - **Large upper lid conjunctival follicles (cobblestones)**
  - Very mild conjunctival hyperemia
  - Limbal follicles (collections of eosinophils more common in African Americans and Asians)
  - Corneal oval shield ulcer
  - Copious ropy mucus discharge
  - High IgE and histamine content in tears

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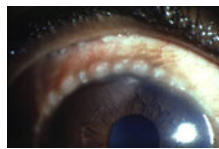
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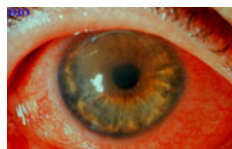
## Vernal Keratoconjunctivitis (VKC)



Upper Tarsal Giant Follicles



Limbal Follicles (Horner-Trantas dots)



Oval Corneal Shield Ulcer

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### Vernal Keratoconjunctivitis (VKC) Treatment

- Ophthalmic steroid gtts
  - Frequent dosing with tapering based on response
- Ophthalmic cyclosporine gtts (Restasis)
- Once stabilized topical mast cell stabilizer/antihistamine can be used

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### Atopic Keratoconjunctivitis (AKC) Definition/Epidemiology

Severe form of SAC with Type I and IV hypersensitivity component

- Onset at age 30-50
- 15-40% of patients suffering from atopic dermatitis may suffer from AKC

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### Atopic Keratoconjunctivitis (AKC) Symptoms/Findings

- Patients may experience itching, burning, photophobia, tearing and blurred vision
- Exam findings may include
  - Atopic dermatitis of lids
  - Loss of eyelashes (madarosis)
  - Papillary conjunctivitis (small or large mostly in inferior tarsal conjunctiva)
  - May develop adhesions between inferior palpebral conjunctiva and globe
  - May develop corneal vascularization

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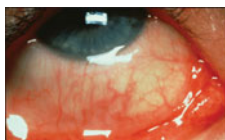
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## Atopic Keratoconjunctivitis (AKC)



Adhesions between inferior tarsal and bulbar conjunctiva (symblepharon)



Loss of Lashes (Madarosis)

Corneal Neovascularization



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## Atopic Keratoconjunctivitis (AKC) Treatment

Due to poor outcomes in natural course of AKC, proper diagnosis and management is especially important.

- Topical mast cell stabilizers and antihistamines are a mainstay in the long term management
- Topical steroids and/or cyclosporine are used for severe disease and exacerbations
- Systemic cyclosporine/tacrolimus is often needed to induce remission
- Allergen avoidance and immunotherapy with allergy specialist can be especially helpful for long term management

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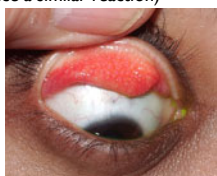
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## Giant Papillary Conjunctivitis

Upper eyelid tarsal conjunctival allergy most commonly to contact lens wear (soft>rigid). Type IV hypersensitivity

- (any foreign body such as ocular prosthesis or sutures can produce a similar reaction)



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### Drug Induced Allergic Conjunctivitis

Often neglected diagnosis, can present bilaterally with coincident onset and therefore confused with SAC or other allergic processes.

- Crucial to elicit history of ophthalmic medications
- May occur after long term use with previous tolerance

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### Drug Induced Allergic Conjunctivitis

Most common hypersensitivities to ophthalmic medications include:

- Beta blockers
- Alpha agonists
- Epinephrine derivatives
- Miotics (Pilocarpine)
- Neomycin
- Preservative (BAK) hypersensitivity

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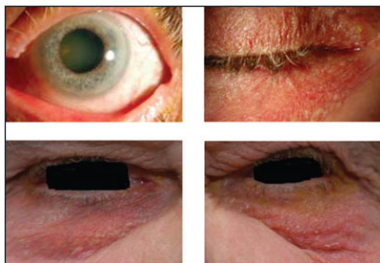
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### Drug Induced Allergic Conjunctivitis

Beta Blocker Hypersensitivity



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## Drug Induced Allergic Conjunctivitis

Beta Blocker Hypersensitivity



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## Drug Induced Allergic Conjunctivitis

Follicular Conjunctivitis with Alpha Agonist Hypersensitivity



Hypersensitivity to BAK or ophthalmic preservatives can present with follicular conjunctivitis as well.

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## Drug Induced Conjunctival Hyperemia

Prostaglandin Analogues used for the treatment of glaucoma (Latanoprost, Bimatoprost, Travoprost) routinely cause conjunctival hyperemia.

- No accompanying itch
- May find exuberant lashes



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### Considerations for Referral

A referral to an eye care professional may be helpful in cases where:

- The diagnosis of a red eye is in question
- For management of the severe spectrum of disease (VKC, AKC, GPC, DIAC) as these are vision threatening
- To monitor for side effects when using steroid treatment

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### Summary

- SAC/PAC is an extremely common condition affecting the vast majority of patients with allergic rhinitis
- When patients suffer from bothersome symptoms two or more days per month effective treatment options are available
- 1 in 20 patients may fall in the spectrum of severe disease
- Consider alternative causes of red eye when treatment is not effective

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### Summary

- Newer generation antihistamine/mast cell stabilizers are more able to block a larger range of histamine receptors and are more specific for conjunctival mast cells.
- Olopatadine may be the first line choice given once per day dosing and specificity for conjunctival mast cells

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